1,190,771

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,190,771

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Date of filing Complete Specification: 7 July 1967

Application Date: 13 April 1966. *No. 16245/66*

Complete Specification Published: 6 May 1970

Index at acceptance:—F1 T(2X, 3A1, 3A2, 3B)

Int. Cl.:—F 01 d 5/14

COMPLETE SPECIFICATION

Improvements in or relating to Turbine and Compressor Blades

We, THE ENGLISH ELECTRIC COMPANY LIMITED, of Bush House, Aldwych, London, W.C.2., formerly of English Electric House, Strand, London, W.C.2, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to turbine and compressor blades.

Such blades may be subjected to rapid rates of heating and/or cooling during operation.

It is known to arrange rotor blades and stator blades of turbines and compressors in rings and to provide a blade platform to one or both ends of each blade.

According to the invention a turbine or compressor blade includes a platform from which the working portion of the blade extends radially with respect to the rotational axis of the turbine or compressor, the platform having formed therein a bore or slot disposed radially of, and substantially symmetrically about, the trailing edge portion of the blade such that the resilience of the platform radially of the said trailing edge portion is increased, whereby to facilitate thermal expansion of the said edge portion along its length, and such that the greatest dimension of the bore or slot measured parallel to a line transverse, when viewed radially, to the said edge portion is substantially less than the greatest dimension of the platform measured parallel to the said line.

Two embodiments of the invention will now be described by way of example with reference to the accompanying drawings of which:

Fig. 1 shows part of a reaction turbine rotor blade according to the invention;

Fig. 2 is a sectional plan view of the embodiment of Fig. 1 taken on the line II-II of Fig. 1;

Fig. 3 is a fragmentary sectional view of the embodiment of Figures 1 and 2 taken on the line III-III of Fig. 2; and

Fig. 4 shows a part of a second embodiment of turbine blade according to the invention.

Referring to Figures 1 to 3, a blade includes an aerofoil-section working portion 10 and a platform 11. The working portion 10 has a leading edge 12 and a thin trailing edge portion 13 and extends from the platform 11 radially with respect to the rotational axis of the turbine. A blind bore 14 is drilled in the platform 11, radially of the thin trailing edge portion 13, so as to be substantially symmetrical about the trailing edge portion and such that thin neck portions 15 are defined in the platform 11, one on each side of the trailing edge portion 13.

Forming the neck portions 15 serves to increase the resilience of the platform so as to facilitate local thermal expansion of the trailing edge portion 13 along its length. It has been found that this reduces the likelihood of cracks occurring in the edge portion, which are believed to be due to thermal stresses. It is also found that, in certain cases, this construction reduces the stresses in the edge portion resulting from flutter or gas bending forces on the blade.

Referring to Fig. 4, in which like parts have been allocated the same reference numerals as in Figures 1 to 3, a slot 16 is cut in the corner of the platform 11 radially of the trailing edge portion 13. The slot 16 extends under the trailing edge portion 13 of the blade such that it is substantially symmetrical about the edge portion of the blade and thus terminates in a line transverse, when viewed radially, to the trailing edge portion 13.

The overhanging platform portion 17 formed by machining the slot 16 serves to increase the resilience of the platform and thus facilitates local thermal expansion of the thin trailing edge portion 13 along its length,